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Natural
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NEBRASKA BIOLOGY TECHNICAL NOTE HANDBOOK (NEBTNH)
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SUBJECT: ECS - BIOLOGY TECHNICAL NOTE HANDBOOK

Purpose: To transmit Nebraska Biology Technical Note No. 69 and 70.

Effective: Upon Receipt.

Filing Instructions: File this technical note, index, and enclosure in your Nebraska Biology Technical Note Handbook.

/s/ Doug Gahn, Acting

STEPHEN K. CHICK
State Conservationist

Enclosures

DIST: NEBTNH

NEBRASKA TECHNICAL NOTE

U. S. Department of Agriculture
Natural Resources Conservation Service

July 15, 2002

BIOLOGY TECHNICAL NOTE NO. 69
Gerald E. Jasmer
Wildlife Biologist

Fish Passage and Culverts

The following information was developed by Terri Skadeland, NRCS State Biologist for Colorado. It provides useful information for evaluating or designing culverts that allow or block the passage of fish from one stream reach or water body to another. It will serve as a reference for the FOTG standard Fish Passage (396).

Fish passage has been a concern for the management of anadromous fish, such as salmon, for many decades. It has only recently become a concern in the Plains states. There is much still to be learned.

August 14, 2001

Fish Passage and Culverts

Terri Skadeland
Colorado NRCS State Biologist

General Information:
The focus of this technical note is culverts and the needs of migratory, cold-water fish species. Fish passage or fishway designs should account for the fish species expected to use the passage and the life stage of these fish. Generally the passage should be designed to allow up-steam passage of the weakest or youngest fish expected to use the passage (OFW 2001).

Things to consider when designing and installing culverts to be used as fish passages are: 1) the water velocity and/or turbulence in the culvert, 2) water depth in the culvert, 3) the jump height, 4) the quality of the jump pool, and 5) debris at the culvert inlet.

Water Velocity in the Culvert:

Culvert Length	Adult Trout	Juvenile
60 feet	4.0 fps	2.0 fps
60-100 feet	4.0 fps	2.0 fps
> 100 feet	Consult NRCS Area or State Biologist	

The culvert pipe should be set at a 1 percent grade or less to avoid excessive velocities.

Minimum Water Depth:
Trout need 8 inches of water in a culvert in order to successfully use the passage.

Maximum Vertical Jump Height at Culvert Entrance and Jump Pool:
Where juvenile trout are expected, the maximum jump height should be 6 inches. Sites where only adult trout are expected may be up to 1 foot height. Depth of the jump pool should be 1.5 times the height of the jump or a minimum of 2 feet. (Use the largest value of the two numbers).

Debris at Culvert Inlet:
An accumulation of debris at the culvert inlet may prevent migrating fish from reaching their goal. Inlets should be inspected regularly and cleaned as needed.

References:

OFW. 2001. Oregon Department of Fish and Wildlife guidelines and criteria for stream-road crossings. http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/orfishaa.htm

WDFW. Upstream fish passage at dams and culverts. Washington Department of Fish and Wildlife. http://www.wa.gov/wdfw/hab/engineer/habeng.htm

Wiest, R.L. 1998. A landowner's guide to building forest access roads. USDA-Forest Service, Northeastern Area. NA-TP-06-98, Radnor, PA.
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NEBRASKA TECHNICAL NOTE

U. S. Department of Agriculture
Natural Resources Conservation Service

July 15, 2002

BIOLOGY TECHNICAL NOTE NO. 70
Gerald E. Jasmer
Wildlife Biologist

PRESCRIBED BURNING AS A WILDLIFE HABITAT MANAGEMENT TOOL

The following information was taken from materials by Steve Clubine. Steve is a Wildlife Biologist in Missouri. Much of the information appeared in the VOL. 19, NO. I issue of the "NATIVE WARM-SEASON GRASS NEWSLETTER". It provides some very good basic principles that should be considered when managing wildlife habitat with prescribed burns.

Spring burning is well established for increasing grass quality, yield, and grazing animal performance, but these aren't the only uses for grasslands and may be in conflict with other uses. For example, spring burning strongly favors big bluestem, Indian grass, eastern gamagrass, many other warm season grasses, but it is often a disadvantage for native wildflowers and insects. Wildlife are temporarily disadvantaged by loss of cover but benefit over the long run from increased plant and insect diversity, reduced litter which makes foraging easier, increased mobility, and increased nesting success (because of less predation) in years between burns.

Native warm-season grasses, such as big bluestem, lndiangrass, eastern gamagrass and switchgrass, respond with increased vigor, growth and competitiveness when they are burned just as they begin to grow. They should have 1 to 1 1/2 inches of new growth when burned. This will normally be in mid to late spring. The time may vary 10 days from year to year depending on the kind of spring, i.e. cool and wet or warm and dry.

Little bluestem and sideoats grama respond less favorably to burning than other native warm-season grasses. They form dense bunches in which the crowns may be damaged if burned when they are too dry. Nevertheless, spring burning helps maintain their vigor and competitiveness.

Spring burns allow full use of winter cover, but may result in such heavy grass growth that forbs are reduced. Summer and fall burns result in many more forbs and dramatically reduced grass dominance, thus providing good brood habitat.

Late spring burning of prairies or native warm-season grasses is the most effective way to reduce competition from smooth bromegrass, Kentucky bluegrass, annual bromegrasses (cheat) and other cool-season grasses. These grasses use nutrients, moisture and sunlight that would be available for native

warm-season grasses. Cool-season grasses grow slowly during the hot summer months, but use large quantities of soil moisture that would be used by the more productive and moisture conserving warm-season grasses. By late spring, cool-season grasses are actively growing but have not had time to replenish the carbohydrate root reserves they used to begin growth in early spring. Burned at this time, they have little reserves left to renew growth and are quickly outgrown by the warm-season grasses.

Similarly, deciduous trees and shrubs, and perennial forbs pull substantial amounts of carbohydrates from root reserves to begin growth. Burned after they leaf-out and then top-killed, they will make further root reserve withdrawals to resprout. Two or three consecutive year burns will control species such as buckbrush (coralberry), western ironweed, and sapling honeylocust and Osage orange, by depleting root reserves. Non-sprouters, like red cedar, may be controlled by one burn if they are less than five feet tall. Larger cedars will need to be cut, and large deciduous trees cut and stumps treated with herbicides to prevent resprouting.

Smooth sumac is similar to warm-season grasses in its food storage. Root reserves do not reach a low point until a month later than other deciduous plants. Therefore, late spring burning will reduce its height but not control it.

Haying has long been used on public prairies to control woodies instead of summer burning. Whereas haying might seem to be more cost effective due to the income the hay provides, it takes a toll on soil fertility because every bale removes significant amounts of phosphorus and potash. Summer burning recycles most soil nutrients so public land managers are using summer burns more frequently. There can be an impact on wildlife whenever habitat is treated during the growing season, whether it is mowing, discing, or burning. August burns probably most reduce the wildlife impact, give the best forb response, and adequate grass regrowth for soil protection. Surprising to many folks is that the fall or winter appearance of a summer burn is almost identical to an area that has been hayed.

Grazing is generally used to reduce excessive cover and grass dominance, and increase early successional forbs that produce seeds for wildlife. It normally has little value for woody control and may be detrimental to late successional forbs such as compass plant. However, brief, intensive grazing may aid woody plant control and reduce the need for frequent burning.

If the primary purpose of your planting or prairie is erosion control or wildlife, remember that it would benefit from an occasional summer burn (July-August), fall burn (October-November), or winter bum (December-January) as well as spring burn (March-April). On public land, expect to see more burning at these times of the year as well as brief periods of high livestock densities, short dormant season mowing, and high, tall growing season mowing, as managers attempt a more balanced effect on plants and animals.

In summary, spring burns, low mowing, or high stock density grazing are best for native warm-season grasses, some late season forbs, and woody plant control. Summer burns, haying, or mowing are best for native forbs (wildflowers) especially early spring flora, and will give some woody plant control, especially in light fuels. Fall burns are good for native forbs, will usually reduce grass dominance, and can help with woody control. Winter bums may reduce grass dominance and increase native forbs slightly, but will have little control on woody invasion, and may aggravate cool-season grass (especially tall fescue) problems.